

BRISTOL BAY SOCKEYE SALMON
SPAWNING ESCAPEMENT TEST FISHING, 2000



by

Frederick W. West

Cindy J. Anderson

Daniel C. Gray

Regional Information Report¹ No. 2A00-36

Alaska Department of Fish and Game
Division of Commercial Fisheries
Regional Office
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AUTHOR

Frederick W. West is a Region II Assistant Bristol Bay Research Biologist for the Alaska Department of Fish and Game, Division of Commercial Fisheries, 333 Raspberry Road, Anchorage, AK 99518.

Cindy J. Anderson is a Region II Assistant Bristol Bay Management Biologist for the Alaska Department of Fish and Game, Division of Commercial Fisheries, 333 Raspberry Road, Anchorage, AK 99518.

Daniel C. Gray is a Region II Bristol Bay Research Biologist for the Alaska Department of Fish and Game, Division of Commercial Fisheries, 333 Raspberry Road, Anchorage, AK 99518.

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ABSTRACT

Drift gillnets were fished daily at two stations, located on opposite river banks, prior to every high slack tide in Kvichak, Egegik, Ugashik, and Igushik Rivers, Bristol Bay, Alaska, from mid-June to mid-July to estimate sockeye salmon spawning escapements. Preliminary estimates were used by fishery managers as an inseason management tool to regulate commercial harvests and achieve escapement goals. The daily test fish index for each river was the mean of catch per unit effort values obtained from all test drifts made on a given day. Numbers of sockeye salmon that escaped the commercial fishery were estimated using (1) travel time analysis in which the most recent cumulative tower count was divided by cumulative test fish indices and lagged back in time by daily increments, and (2) the mean escapement per index point (EPI) value. Mean EPI estimates were available on the first day of each project. Travel time estimates could not be made until a minimum of test fishing data and tower counts were collected.

KEY WORDS: Sockeye salmon *Onchorhynchus nerka*, test fishing, spawning escapement estimation, estimation, fisheries management, Bristol Bay

INTRODUCTION

River test fishing conducted by the Alaska Department of Fish and Game (ADF&G) is used to estimate numbers of salmon that have escaped commercial fishing districts and entered their natal streams. In Bristol Bay, river test fisheries are used to manage sockeye salmon *Onchorhynchus nerka* fisheries (Figure 1). Test-fishery data are available approximately 1 day after sockeye salmon have passed through the commercial fishing district and several days earlier than estimates based on visual counts from observation towers located at the heads of the river systems. Spawning escapement estimates based on test-fish data assist management biologists in regulating commercial fishing periods to maximize harvests and achieve escapement goals. Test-fishing projects have been operated on Kvichak River since 1960, on Egegik River since 1963, on Ugashik River since 1961, and on Igushik River since 1976 (McBride 1978; Paulus 1965). This report summarizes 2000 river test-fish data and evaluates the accuracy of inseason forecasting methods.

METHODS

River Test Fishing

Two stations on opposite river banks were fished in the lower section of Kvichak, Egegik, Ugashik, and Igushik Rivers (Table 1). Test-fish stations were close to the commercial fishing district boundary and assumed to be above sockeye salmon milling areas. Station locations for each of the four rivers have remained the same since 1987 (Fried and Bue 1988a).

Gillnets were drifted at all test-fish sites to estimate sockeye salmon abundance. All drifts were made perpendicular and close to shore based on the assumption that sockeye salmon migrate parallel to and near the riverbank. Drifts at all stations ended when the inshore end of the net drifted about 25 m offshore or when it was no longer fishing efficiently. Two short drifts of <15 min duration were made at each station of each river beginning about 1.5 h before every high slack tide to minimize currents carrying the gillnet offshore. When catches increased to the point where two drifts per station per tide were difficult to process given time restraints, only one drift was made at each station until catches fell to a manageable level again.

All gillnets were 45.7 m (150 ft or 25 fathoms) in length and 29 meshes deep. Monotwist web, hung even with #50 twine and dyed Momoi shade #1, was used for test fishing on all rivers. Multistrand monofilament was used until 1989; however, this web type is now illegal for commercial use and is no longer stocked by suppliers. A stretched mesh size of 12.70 cm (5 in) was used on Kvichak River and 13.02 cm (5-1/8 in) was used on Egegik, Ugashik, and Igushik Rivers.

Catch per unit of effort (CPUE), or the number of sockeye salmon caught in 180 m (600 ft or 100 fathoms) of gillnet fished for 1 h, was estimated for each set. Water temperature (°C) was recorded at all rivers on every high tide prior to test fishing.

Data Analyses

Mean fishing time (MT), in minutes, was calculated for each set as

$$MT = SI - FO + \frac{(FO - SO) + (FI - SI)}{2}, \quad (1)$$

where:

SO = time the gillnet first entered water,

FO = time the gillnet was fully deployed,

SI = time the gillnet retrieval began, and

FI = time the gillnet retrieval completed.

The CPUE value, C_j , or the number of sockeye salmon caught per 100 fathom hours, was calculated for set j as follows:

$$C_j = 6,000 \frac{N}{G \times MT}, \quad (2.1)$$

where:

N = number of sockeye salmon caught, and

G = gillnet length in fathoms.

The daily test fish index, I_i , for day i was calculated as the mean of individual CPUE values obtained from sets made the same day, or

$$I_i = \frac{\sum_{j=1}^s C_j}{S}, \quad (2.2)$$

where:

S = number of sets made during day i (usually four sets per day).

Two methods were used to estimate daily spawning escapements: (1) travel-time (EPI_d), and (2) mean EPI value (EPI_a).

(1) Travel-time estimates of spawning escapements were based on the number of days it took sockeye salmon to travel from test fish sites to counting tower sites. A range of travel-time estimates was calculated by matching daily test-fish indices to daily tower counts. The number of sockeye salmon represented by each index point was calculated by dividing the most recent cumulative tower count by cumulative test-fish indices lagged back in time by daily increments such that

$$EPI_d = \frac{\sum_{i=1}^t E_i}{\sum_{i=1}^{t-d} I_i}, \quad (3)$$

where:

EPI_d = number of sockeye salmon represented by each test fishing index point based on a travel-time of d days,

E_i = number of sockeye salmon traveling past counting tower on day i , and

t = day of most recent escapement estimate.

The best initial estimate of travel time was the model that produced the smallest sum of squared errors between daily cumulative test-fish indices and tower counts. However, travel times that seemed unrealistic based on results of past studies or produced unreasonable escapement estimates (e.g., less than observed escapement) were rejected even if they produced the best statistical fit to the data.

Total spawning escapement was then estimated as

$$\hat{E}_{t+d} = EPI_d \sum_{i=1}^t I_i, \quad (4)$$

where:

E_{t+d} = estimated number of sockeye salmon that will travel past counting tower on day $t+d$.

(2) Mean EPI value estimates of spawning escapements were based on pre-season calculated mean EPI values. Mean EPI was derived using some combination of final fish per index (FPI) values recorded on the last day of test fishing from 1985-1999 (1988-1999 for Igushik R.) (Tables 2-5). The years selected for the mean EPI value reflect recent trends in final EPI, recent trends in run strength, preseason forecast of abundance and age structure, and in some cases exclude historic highs and lows. The mean EPI estimate of spawning escapement is the product of the mean EPI and the cumulative test fish index. Mean EPI value estimates of spawning escapements were used until travel time analysis estimates proved more accurate.

Three statistics were used to measure performance of the various escapement estimators. Percent error, PE, was used to measure daily performance:

$$PE = 100 \times \frac{T_{t,a} - \sum_{i=1}^{t+d} E_i}{\sum_{i=1}^{t+d} E_i}, \quad (5)$$

where:

$T_{t,a}$ = estimated cumulative spawning escapement on day t based on method a .

Mean percent error, MPE, was used to measure bias:

$$MPE = \sum_{t=1}^n \left(\frac{100 \times T_{t,a} - \sum_{i=1}^{t+d} E_i}{\sum_{i=1}^{t+d} E_i} \right), \quad (6)$$

where:

n = total number of days that escapement estimates based on test fishing were available.

Mean absolute percent error, MAPE, was used to measure overall accuracy because it treated under- and over-estimation errors similarly:

$$MAPE = \sum_{t=1}^n \left| \left(100 \times \frac{T_{t,a} - \sum_{i=1}^{t+d} E_i}{\sum_{i=1}^{t+d} E_i} \right) \right| \quad (7)$$

RESULTS

Kvichak River

Test fishing began 21 June and ended 16 July. A total of 3,129 sockeye salmon were caught, producing 40,186 index points (Table 2, Appendix A.1). Test fish escapement estimates for 25 June to 1 July were based on the 1985-99 mean EPI value of 105 (Table 2). Sufficient spawning escapement data were collected by 2 July to allow estimation of EPI values based on travel time (Table 2). Estimated travel times during the season ranged from 1 to 2 d. On the last day of project operation, the best estimate of travel time was 2 d and the EPI was 51 (Table 2, Appendix B.1.).

Daily escapement estimates based on the 1985-99 mean EPI (22 June to 1 July) ranged from 32% less to 250% greater than visual counts from towers, assuming actual travel time was 2 d (Table 2). Daily escapement estimates based on travel time analysis (2 – 16 July) ranged from 24% less to 18% greater than tower counts (Table 2, Figure 2). The travel time analysis estimate of 2,049,486 sockeye salmon on 16 July was 14% greater than the lagged cumulative tower count (18 July) of 1,791,282.

Accuracy (MAPE) and bias (MPE) for all test fish escapement estimates compared to lagged tower counts was 66% and 47% respectively (Table 2). When the comparison was restricted to travel time analysis only (2 to 16 July) accuracy and bias improved to 15% and -9% respectively.

Egegik River

Test fishing began 14 June and ended 13 July. A total of 2,723 sockeye salmon were caught producing a cumulative index of 13,517 (Table 3, Appendix A.2.). Test fish escapement estimates for 18 - 28 June were based on the 1985-99 mean EPI value of 77 (Table 3). Sufficient spawning escapement data were collected by 29 June to allow estimation of EPI values based on travel time (Table 3). Estimated travel times during this period ranged from 2 to 3 d. On the last day of project operation, the best estimate of travel time was 2 d and the EPI was 80 (Table 3, Appendix B.2.).

Daily escapement estimates based on the 1985-99 mean EPI (17 to 28 June) ranged from 18% less to 352% greater than visual counts from towers, assuming actual travel time was 2 d (Table 3). Daily escapement estimates based on travel time analysis (29 June to 13 July) ranged from 9% less to 24% greater than tower counts (Table 3, Figure 3). The travel time analysis estimate

of 1,081,360 sockeye salmon on 13 July was 6% greater than the lagged cumulative tower count on 15 July of 1,024,800.

Accuracy (MAPE) and bias (MPE) for all test fish escapement estimates compared to lagged tower counts was 59% and 52% respectively (Table 3). When the comparison was restricted to travel time analysis only (29 June to 13 July), accuracy and bias improved to 5% and 2% respectively.

Ugashik River

Test fishing began 24 June and ended 20 July. A total of 1,677 sockeye salmon were caught producing a cumulative index of 14,901 (Table 4, Appendix A.3.). Test fish escapement estimates for 24 June to 6 July were based on the 1991-99 mean EPI value of 58 (Table 4). Sufficient spawning escapement data were collected by 7 July to allow estimation of EPI values based on travel time (Table 4). Estimated travel times during this period ranged from 1 to 3 d. On the last day of project operation, the best estimate of travel time was 2 d and the EPI was 42 (Table 4, Appendix B.3.).

Daily escapement estimates based on the 1991-99 mean EPI (1 to 6 July) ranged from 80% to 123% greater than visual counts from towers, assuming actual travel time was 2 d (Table 4). Daily escapement estimates based on travel time analysis (7 - 20 July) ranged from 20% less to 12% greater than tower counts (Table 4, Figure 4). The travel time analysis estimate of 625,842 sockeye salmon on 20 July was 12% greater than the lagged cumulative tower count on 22 July of 557,268.

Accuracy (MAPE) and bias (MPE) for all test fish escapement estimates compared to lagged tower counts was 33% and 22% respectively (Table 4). When the comparison was restricted to travel time analysis only (7 - 20 July), accuracy and bias improved to 9% and -7% respectively.

Igushik River

Test fishing began 16 June and ended 9 July. A total of 1,365 sockeye salmon were caught producing a cumulative index of 8,002 (Table 5, Appendix A.4.). Test fish escapement estimates for 16 - 30 June were based on the 1997-99 mean EPI value of 17 (Table 5). Sufficient spawning escapement data were collected by 1 July to allow estimation of EPI values based on travel time (Table 5). Estimated travel times during this period ranged from 2 to 4 d. On the last day of project operation, the best estimate of travel time was 3 d and the EPI was 45 (Table 5, Appendix F.4.).

Daily escapement estimates based on the historic mean EPI (21 - 30 June) ranged from 73% less to 508% greater than visual counts from towers, assuming actual travel time was 3 d (Table 5). Daily escapement estimates based on travel time analysis (1 to 9 July) ranged from 48% less to 33% greater than tower counts (Table 5, Figure 5). The travel time analysis estimate of 360,090 sockeye salmon on 9 July was 7% less than the lagged cumulative tower count on 10 July of 387,138.

Accuracy (MAPE) and bias (MPE) for all test fish escapement estimates compared to lagged tower counts was 76% and -4% respectively (Table 5). When the comparison was restricted to travel time analysis only (1 to 9 July), accuracy improved to 23% and bias worsened to -11%.

DISCUSSION

The Bristol Bay river test fish pre-season mean EPI's performed poorly on all rivers in 2000. The mean EPI value was high for Kvichak and Ugashik rivers (Appendices B.1 and B.3.) and low for Egegik and Igushik rivers (Appendices B.2 and B.4.). The difference was most exaggerated on Kvichak River where the mean EPI was 105 and the final EPI was 51 (Appendix B.1.). (Appendix B.2.). Egegik River's mean EPI of 77 was the best estimate of the final EPI of 80 (Table 3.). The greatest variability of EPI's using lag time relationships occurred on the Igushik River where it ranged from 24 to 50 (Table 5.).

Two factors may have caused the overestimation of the Kvichak test fish escapement estimates: 1) the reduced proportion of 2-ocean fish and 2) too high of a pre-season mean EPI. The 1980-99 historical average Kvichak commercial catch and escapement was 75% 2-ocean and 25% 3-ocean fish (Gray and Link 1999). The 2000 catch exhibited an age class composition of 28% 2-ocean and 72% 3-ocean fish. Only 1996 had a similar complete reversal of age classes with 32% 2-ocean and 68% 3-ocean fish. The 1996 test fishery appeared to have performed satisfactorily with the travel time analysis estimate only 1% less than the lagged cumulative tower count. However, the pre-season mean EPI of 93 performed poorly, ending with a final EPI of 77 (Gray et al. 1999). All Bristol Bay inriver test fish projects combined resembled Kvichak with 22% 2-ocean and 78% 3-ocean in 2000. The 1980-1999 all project average was 62% 2-ocean and 38% 3-ocean.

The Kvichak mean EPI of 105 may have been overly robust since it was calculated using the 1985-99 average using only pre-peak and peak. This would be especially problematic since the run resembled an off-cycle year.

Preliminary Igushik inriver test-fish indices, commercial catches, and large escapements indicated an early substantial run. The mean EPI of 17 was determined to be too low approximately a week into the project based on high tower counts. The mean EPI was doubled on 27 June and tripled on 28 June for the following three days until lag time relationships became more effective on 1 July (Table 5.). Inriver mean EPI's should continue to be evaluated in season to ensure Estimated River Fish calculations are as accurate as possible.

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Table 1. Locations (GPS coordinates) of Bristol Bay sockeye salmon test-fishing stations.

River	Test - Fishing Stations	River Bank	GPS Coordinates ¹
Kvichak River	1	West	N 59° 01' 22.5", W 156° 52' 33.9"
	2	East	N 59° 03' 24.1", W 156° 51' 06.6"
Egegik River	1	South	N 58° 11.993", W 157° 11.087'
	2	North	N 58° 12.150", W 157° 10.465'
Ugashik River	1	East	N 57° 33.244', W 157° 25.365"
	2	West	N 57° 33.423', W 157° 25.554"
Igushik River	1	South	N 58° 49.51', W 159° 02.36'
	2	North	N 58° 49.48', W 159° 02.36'

¹ GPS coordinates are generally considered to be accurate within 17m.

Table 2. Sockeye salmon spawning escapement test-fishing data summary and comparison to tower counts, Kvichak River, 2000.

Test Fishing								Observation Tower		Percent Error
Date	Fishing Time(min)	Catch (no)	Daily Index	Cumulative Index	Escapement per Index Pt. ¹	Cumulative Escapement	Estimated River Fish ³	Date Plus Travel Time ²	Cumulative Escapement	of Test Fishing Estimate
6/21	73.5	0	0	0	105	0		6/23	108	
6/22	75.7	1	4	4	105	420		6/24	180	133
6/23	75.5	1	3	7	105	735		6/25	210	250
6/24	31.2	2	17	23	105	2,415		6/26	3,570	-32
6/25	73.0	146	668	691	105	72,555	70,000	6/27	21,474	238
6/26	58.8	155	657	1,349	105	141,645	140,000	6/28	41,886	238
6/27	31.1	2	16	1,365	105	143,325	140,000	6/29	66,486	116
6/28	48.0	206	1,196	2,561	105	268,905	250,000	6/30	143,766	87
6/29	18.0	36	284	2,845	105	298,725	400,000 ⁴	7/01	214,206	39
6/30	24.5	272	3,390	6,235	105	654,675	500,000	7/02	390,126	68
7/1	25.6	406	4,407	10,641	105	1,117,305	650,000	7/03	606,708	84
7/2	34.4	69	495	11,136	49	545,664	300,000	7/04	701,700	-22
7/3	34.8	18	124	11,260	49	551,740	100,000	7/05	725,208	-24
7/4	59.6	3	12	11,272	54	608,688	10,000	7/06	731,790	-17
7/5	74.7	6	18	11,290	55	620,950	10,000	7/07	734,226	-15
7/6	73.8	0	0	11,290	56	632,240	10,000	7/08	737,634	-14
7/7	28.1	166	1,492	12,782	56	715,792	70,000	7/09	790,482	-9
7/8	29.8	136	1,107	13,889	56	777,784	100,000	7/10	869,382	-11
7/9	54.3	37	184	14,072	54	759,888	70,000	7/11	891,570	-15
7/10	32.4	195	1,561	15,633	55	859,815	100,000	7/12	1,080,930	-20
7/11	26.7	272	2,950	18,583	56	1,040,648	350,000	7/13	1,358,364	-23
7/12 ⁵			4,123	22,706	62	1,407,772	350,000	7/14	1,508,904	-7
7/13	17.1	311	5,295	28,001	66	1,848,066	500,000	7/15	1,650,666	12
7/14	24.6	303	3,664	31,665	53	1,678,245	500,000	7/16	1,713,084	-2
7/15	13.2	295	5,488	37,153	56	2,080,568	300,000	7/17	1,759,458	18
7/16	9.1	91	3,033	40,186	51	2,049,486	125,000	7/18	1,791,282	14
6/24 - 7/16					Mean Percent Error (MPE)					47
					Mean Absolute Percent Error (MAPE)					66
7/2 - 7/16					Mean Percent Error (MPE)					-9
					Mean Absolute Percent Error (MAPE)					15

¹ The 1985-99 mean escapement per index point relationship (105 EPI) was used until July 2 when lag-time relationships began to prove more accurate.

² Best travel time estimate at the end of the season was 2 d.

³ Estimated river fish is a subjective estimate of fish that have entered the river but have not passed the counting tower based on all available information.

⁴ Afternoon drifts missed due to motor problems. Estimated River Fish (ERF) was estimated using afternoon drifts from June 28 and morning drifts from June 29.

⁵ No test fishing conducted due to motor problems. Daily index was interpolated using data from July 11 and 13.

Table 3. Sockeye salmon spawning escapement test-fishing data summary and comparison to tower counts, Egegik River, 2000.

Test Fishing								Observation Tower		Percent Error
	Fishing	Catch	Daily	Cumulative	Escapement	Cumulative	Estimated	Date Plus	Cumulative	of Test
Date	Time(min)	(no)	Index	Index	per Index Pt. ¹	Escapement	River Fish ⁴	Travel Time ²	Escapement	Fishing Estimate
6/14	37.4	2	13	13	77	1,001		6/16	³	
6/15	71.0	10	33	46	77	3,542		6/17	³	
6/16	78.5	12	37	83	77	6,391		6/18	³	
6/17	67.0	40	151	235	77	18,095		6/19	6,234	190
6/18	67.6	94	335	570	77	43,890	40,000	6/20	12,330	256
6/19	66.5	187	683	1,252	77	96,404	96,000	6/21	21,348	352
6/20	53.3	88	406	1,659	77	127,743	113,000	6/22	28,776	344
6/21	72.2	51	177	1,836	77	141,372	120,000	6/23	42,750	231
6/22	68.4	15	52	1,888	77	145,376	100,000	6/24	91,734	58
6/23	64.3	20	86	1,975	77	152,075	100,000	6/25	185,790	-18
6/24	31.0	340	3,294	5,269	77	405,713	300,000	6/26	345,258	18
6/25	54.3	231	1,391	6,660	77	512,820	300,000	6/27	547,164	-6
6/26	74.0	39	123	6,783	77	522,291	200,000	6/28	592,398	-12
6/27	35.5	19	128	6,911	77	532,147	20,000	6/29	610,608	-13
6/28	70.5	28	95	7,006	77	539,462	40,000	6/30	618,366	-13
6/29	71.7	73	231	7,237	90	651,330	40,000	7/1	641,946	1
6/30	71.1	66	220	7,457	89	663,673	40,000	7/2	651,606	2
7/1	69.6	17	57	7,514	91	683,774	40,000	7/3	675,546	1
7/2	67.6	60	218	7,732	87	672,684	30,000	7/4	697,440	-4
7/3	72.9	4	14	7,746	90	697,140	25,000	7/5	763,170	-9
7/4	53.0	300	1,912	9,658	90	869,220	185,000	7/6	779,808	11
7/5	66.4	86	302	9,961	98	976,178	150,000	7/7	786,168	24
7/6	66.1	15	55	10,015	80	801,200	30,000	7/8	792,000	1
7/7	61.4	9	34	10,050	78	783,900	7,000	7/9	795,906	-2
7/8	73.0	15	47	10,097	79	797,663	7,000	7/10	805,986	-1
7/9	68.1	39	136	10,233	79	808,407	10,000	7/11	855,006	-5
7/10	72.1	293	1,000	11,232	79	887,328	10,000	7/12	917,130	-3
7/11	83.1	238	744	11,976	83	994,008	100,000	7/13	962,082	3
7/12	33.3	132	947	12,924	81	1,046,844	125,000	7/14	1,011,306	4
7/13	79.5	200	593	13,517	80	1,081,360	125,000	7/15	1,024,800	6
6/16 - 7/13								Mean Percent Error(MPE)		52
								Mean Absolute Percent Error(MAPE)		59
6/29 - 7/13								Mean Percent Error(MPE)		2
								Mean Absolute Percent Error(MAPE)		5

¹ The 1985-99 mean escapement per index point relationship (77 EPI) was used until June 29 when lag-time relationships began to prove more accurate.

² Best travel time estimate at end of season was 2 d.

³ Observation towers not in operation.

⁴ Estimated river fish is a subjective estimate of fish that have entered the river but have not passed the counting tower based on all available information.

Table 4. Sockeye salmon spawning escapement test-fishing data summary and comparison to tower counts, Ugashik River, 2000.

Test Fishing								Observation Tower		Percent Error
Date	Fishing Time(min)	Catch (no)	Daily Index	Cumulative Index	Escapement per Index Pt. ¹	Cumulative Escapement	Estimated River Fish ⁴	Date Plus Travel Time	Cumulative Escapement	of Test Fishing Estimate
6/24	26.1	6	54	54	58	3,132		6/26	3	
6/25	71.6	10	32	86	58	4,988		6/27	3	
6/26	97.7	7	17	103	58	5,974	6,000	6/28	3	
6/27	94.7	4	10	113	58	6,554	7,000	6/29	3	
6/28	44.8	5	27	140	58	8,120	8,000	6/30	3	
6/29	78.3	53	174	314	58	18,212	18,000	7/1	3	
6/30	36.5	111	676	990	58	57,420	60,000	7/2	3	
7/1	14.9	89	1,271	2,261	58	131,138	135,000	7/3	58,800	123
7/2	11.9	87	1,785	4,046	58	234,668	220,000	7/4	126,780	85
7/3	23.0	134	1,380	5,426	58	314,708	260,000	7/5	166,986	88
7/4	50.6	32	176	5,602	58	324,916	200,000	7/6	178,044	82
7/5	67.2	17	67	5,669	58	328,802	50,000	7/7	181,680	81
7/6	94.6	12	30	5,699	58	330,542	10,000	7/8	183,822	80
7/7	92.6	8	21	5,720	31	177,320	2,000	7/9	186,210	-5
7/8	94.6	37	95	5,815	31	180,265	4,000	7/10	187,956	-4
7/9	93.3	41	105	5,920	32	189,440	8,000	7/11	194,394	-3
7/10	98.5	66	161	6,081	32	194,592	15,000	7/12	207,936	-6
7/11	82.9	74	228	6,309	32	201,888	15,000	7/13	230,886	-13
7/12	42.9	39	221	6,530	34	222,020	20,000	7/14	238,134	-7
7/13	66.8	95	340	6,870	36	247,320	30,000	7/15	249,948	-1
7/14	71.0	100	356	7,226	36	260,136	30,000	7/16	267,522	-3
7/15	49.5	92	439	7,665	36	275,940	30,000	7/17	338,490	-18
7/16	20.8	200	2,347	10,012	36	360,432	100,000	7/18	422,568	-15
7/17	18.8	123	1,602	11,614	33	383,262	75,000	7/19	481,506	-20
7/18	21.2	81	1,071	12,685	35	443,975	70,000	7/20	514,998	-14
7/19	23.7	102	1,182	13,867	40	554,680	90,000	7/21	537,996	3
7/20	11.1	52	1,034	14,901	42	625,842	NE ⁵	7/22	557,268	12
7/1 - 7/20						Mean Percent Error(MPE)		22		
						Mean Absolute Percent Error(MAPE)		33		
7/7 - 7/20						Mean Percent Error(MPE)		-7		
						Mean Absolute Percent Error(MAPE)		9		

¹ The 1991-99 trimmed mean escapement per index point relationship (58 EPI) was used until July 7 when lag-time relationships began to prove more accurate.

² Best travel time estimate at end of season was 2 d.

³ Observation towers not in operation.

⁴ Estimated river fish is a subjective estimate of fish that have entered the river but have not passed the counting tower based on all available information.

⁵ No estimate made.

Table 5. Sockeye salmon spawning escapement test-fishing data summary and comparison to tower counts, Igushik River, 2000.

Test Fishing								Observation Tower		Percent Error of Test Fishing Estimate
Date	Fishing Time(min)	Catch (no)	Daily Index	Cumulative Index	Escapement per Index Pt. ¹	Cumulative Escapement	Estimated River Fish ⁴	Date Plus Travel Time	Cumulative Escapement	
6/16	37.1	3	17	17	17	289		6/19	3	
6/17	- ⁵	-	-	-	-	-		6/20	3	
6/18	112.8	65	138	156	17	2,652		6/21	3	
6/19	92.9	136	406	562	17	9,554	10,000	6/22	3	
6/20	99.6	35	85	647	17	10,999	10,000	6/23	3	
6/21	88.6	10	29	676	17	11,492	10,000	6/24	1,890	508
6/22	96.7	2	6	682	17	11,594	10,000	6/25	7,650	52
6/23	87.6	57	177	859	17	14,603	14,000	6/26	24,462	-40
6/24	58.3	61	229	1,088	17	18,496	16,000	6/27	65,166	-72
6/25	86.5	106	517	1,605	17	27,285	20,000	6/28	89,190	-69
6/26	86.7	65	260	1,865	17	31,705	20,000	6/29	94,032	-66
6/27	38.0	21	176	2,041	17	34,697	40,000 ⁶	6/30	97,536	-64
6/28	93.4	1	2	2,043	17	34,731	15,000 ⁷	7/1	102,120	-66
6/29	97.2	0	0	2,043	17	34,731	6,000 ⁷	7/2	111,516	-69
6/30	80.0	80	238	2,281	17	38,777	16,000 ⁷	7/3	146,088	-73
7/1	53.9	234	2,078	4,359	47	204,873	120,000	7/4	200,298	2
7/2	57.7	239	2,541	6,900	50	345,000	250,000	7/5	259,200	33
7/3	62.0	136	805	7,705	48	369,840	200,000	7/6	313,422	18
7/4	86.9	58	157	7,862	30	235,860	40,000	7/7	345,588	-32
7/5	96.2	30	74	7,936	24	190,464	30,000 ⁸	7/8	363,072	-48
7/6	97.9	21	50	7,986	31	247,566	30,000 ⁸	7/9	374,124	-34
7/7	111.8	0	0	7,986	38	303,468	30,000	7/10	380,928	-20
7/8	114.1	3	6	7,992	41	327,672	10,000	7/11	384,066	-15
7/9	51.4	2	10	8,002	45	360,090	NE ⁹	7/12	387,138	-7
6/24 - 7/9						Mean Percent Error(MPE)				-4
						Mean Absolute Percent Error(MAPE)				76
7/1 - 7/9						Mean Percent Error(MPE)				-11
						Mean Absolute Percent Error(MAPE)				23

¹ The 1997-99 mean escapement per index point relationship (17 EPI) was used until July 1 when lag-time relationships began to prove more accurate.

² Best travel time estimate at end of season was 3 d.

³ Observation towers not in operation.

⁴ Estimated river fish is a subjective estimate of fish that have entered the river but have not passed the counting tower based on all available information.

⁵ No test fishing conducted due to motor problems.

⁶ EPI was doubled for the daily inriver fish estimate based on aerial surveys and high tower counts.

⁷ EPI was tripled for the daily inriver fish estimate based on aerial surveys and high tower counts.

⁸ Estimated river fish was based on an EPI of 38, reinforced by maximum likelihood method.

⁹ No estimate made.

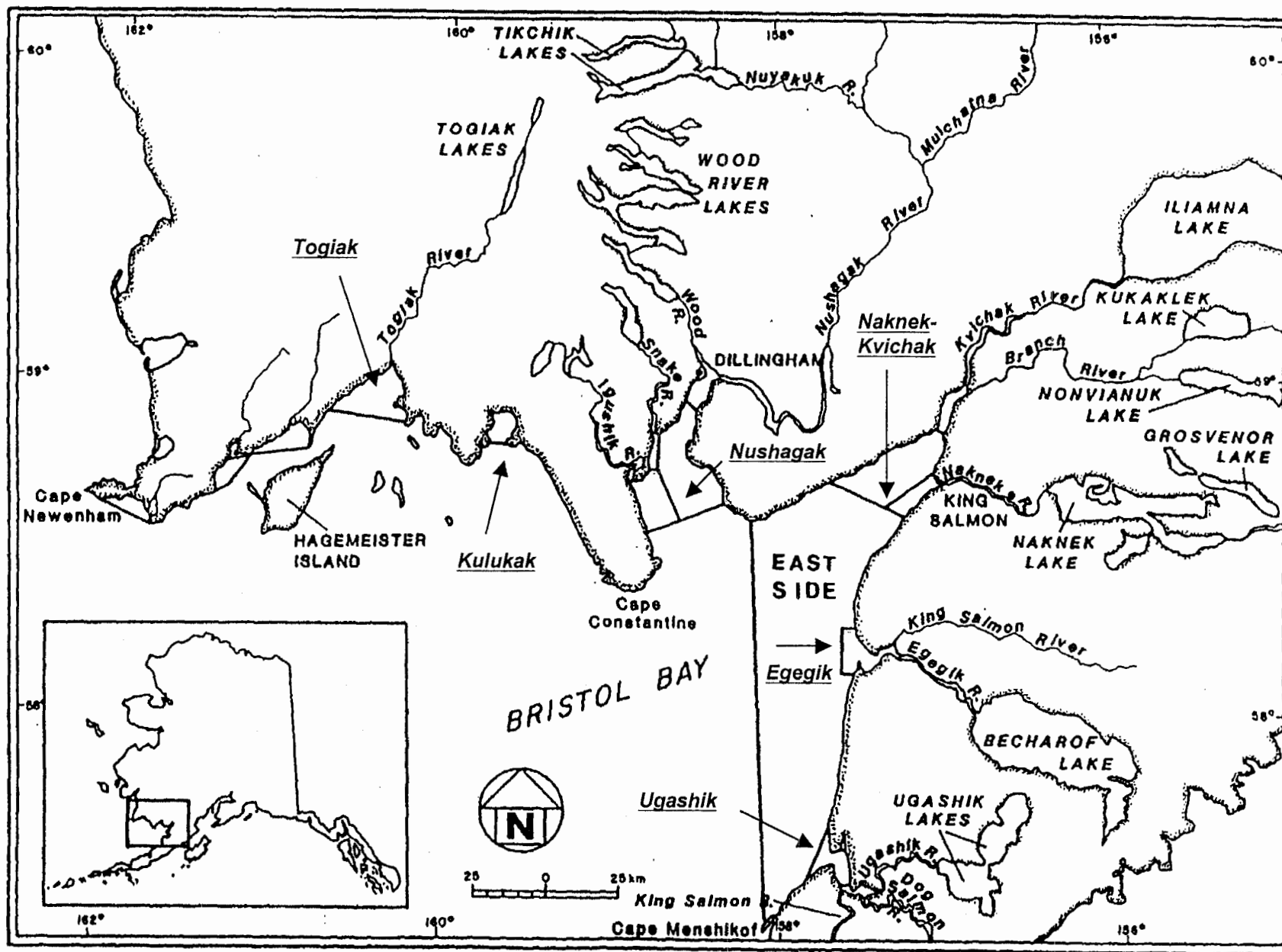


Figure 1. Bristol Bay major river systems and commercial fishing districts.

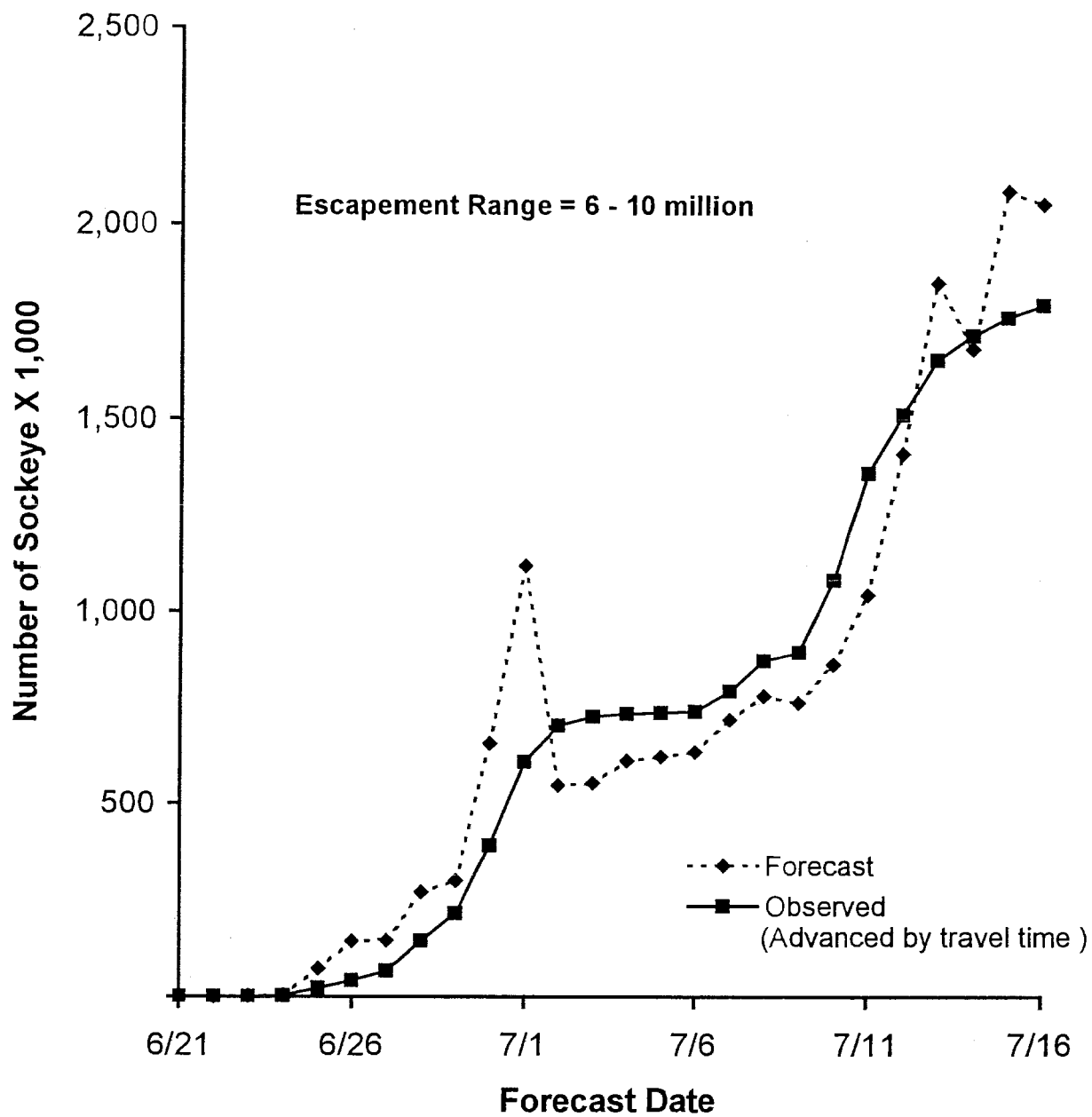


Figure 2. Comparison of in-season sockeye salmon test fish forecast and observed escapement, Kvichak River, 2000.

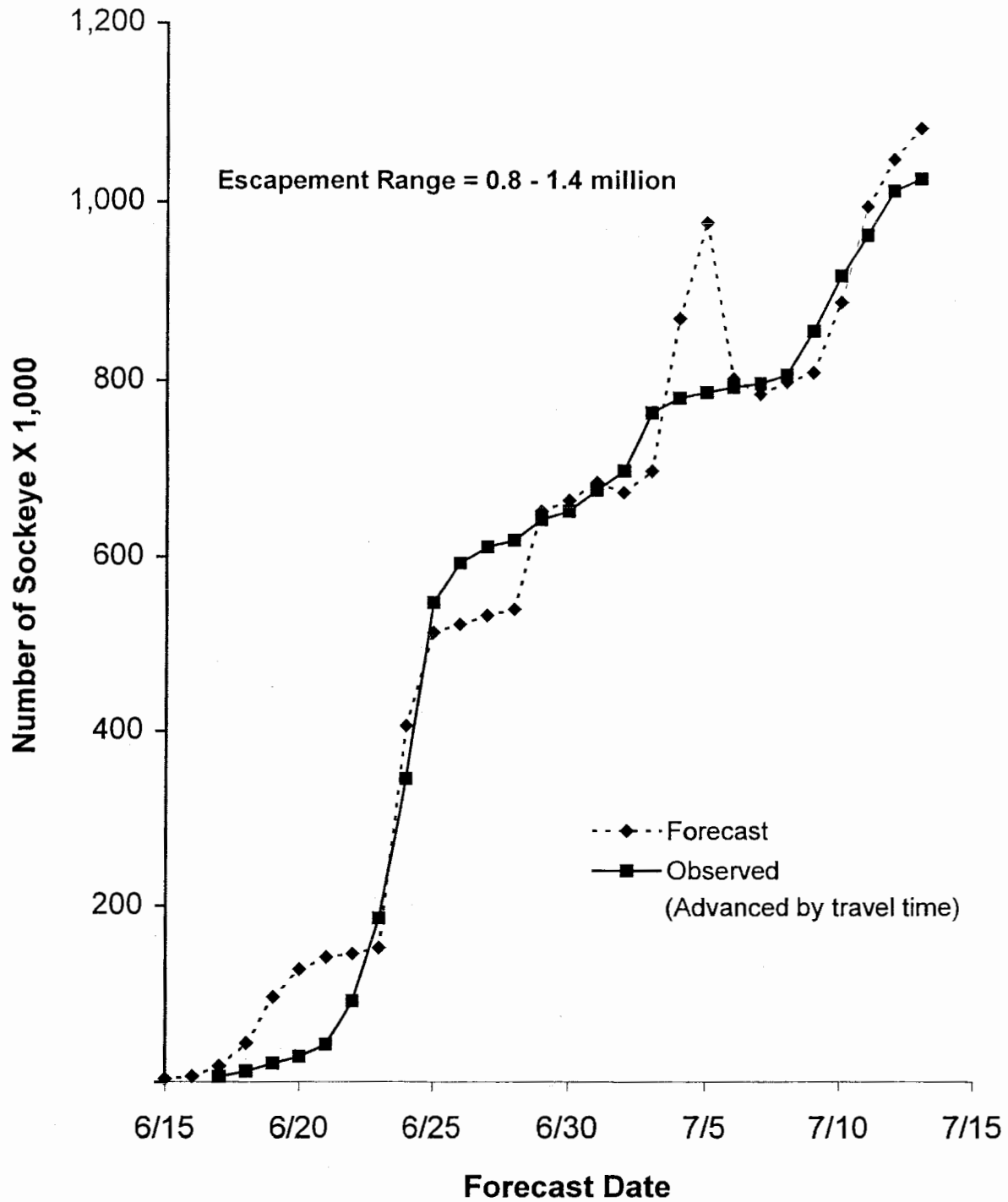


Figure 3. Comparison of in-season sockeye salmon test fish forecast and observed escapement, Egegik River, 2000.

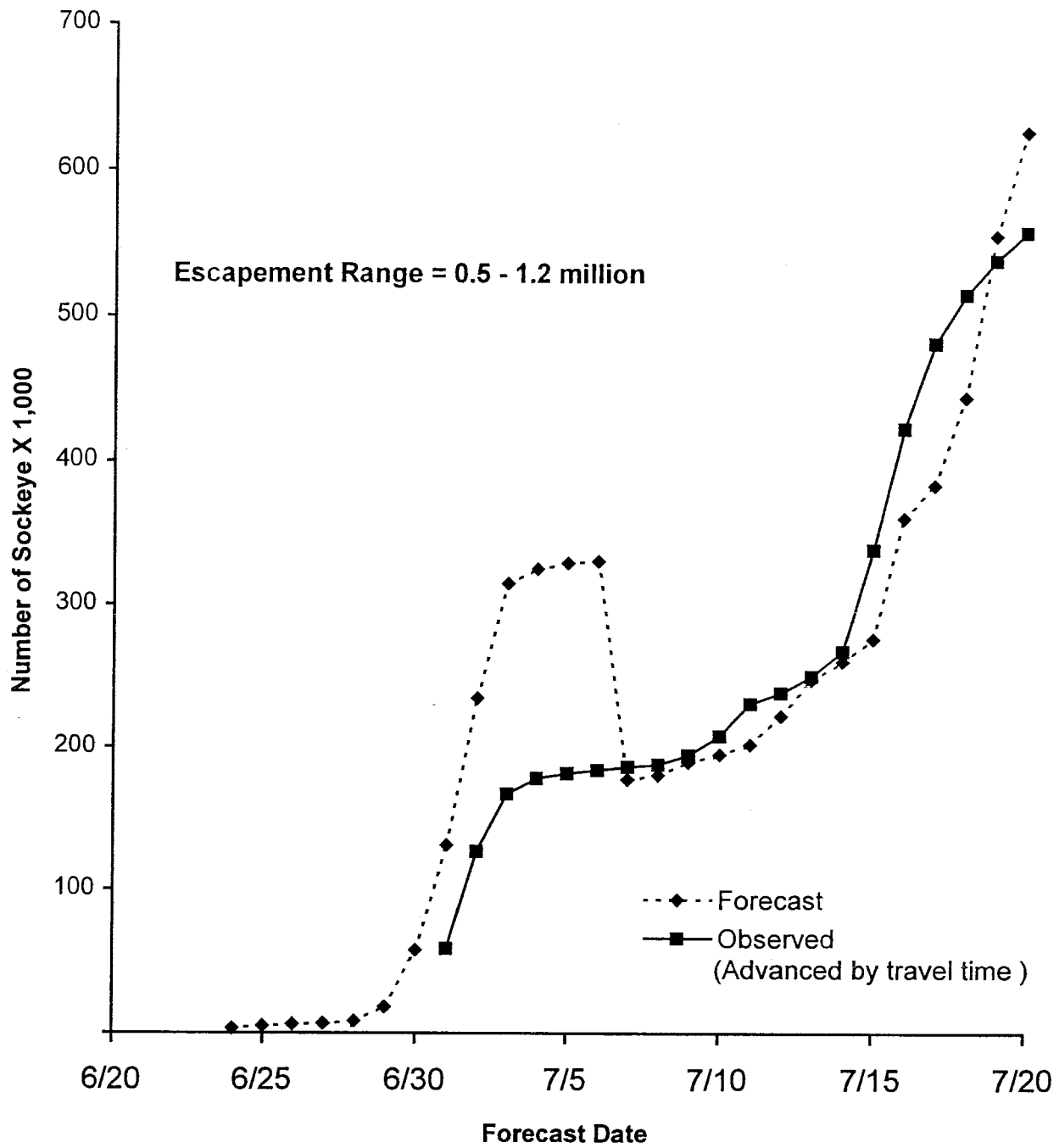


Figure 4. Comparison of in-season sockeye salmon test fish forecast and observed escapement, Ugashik River, 2000.

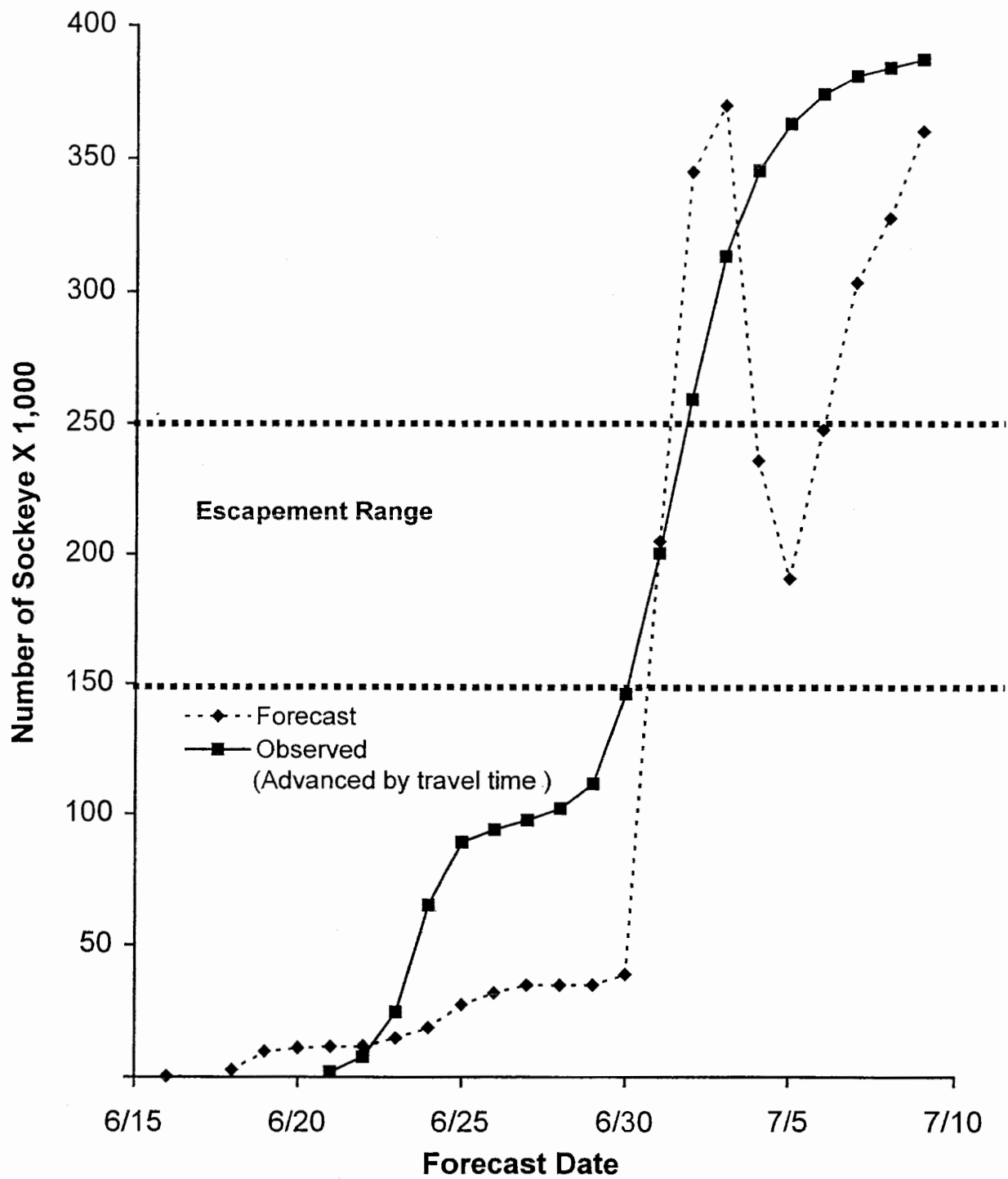


Figure 5. Comparison of in-season sockeye salmon test fish forecast and observed escapement, Igushik River, 2000.

APPENDIX

Appendix A.1. Sockeye salmon test-fishing data, Kvichak River, 2000

Date	Set No.	Station	Mean Fishing Time(min)	Sockeye Catch	Test Fishing Index	Water Temp(C)
6/21	1	1	10.8	0	0	12
6/21	2	1	11.0	0	0	12
6/21	3	2	8.0	0	0	12
6/21	4	2	8.3	0	0	12
6/21	5	1	9.8	0	0	12
6/21	6	1	8.3	0	0	12
6/21	7	2	8.8	0	0	12
6/21	8	2	8.5	0	0	12
6/22	9	1	9.3	0	0	12
6/22	10	1	9.8	0	0	12
6/22	11	2	9.5	0	0	12
6/22	12	2	10.0	0	0	12
6/22	13	1	10.0	0	0	12
6/22	14	1	9.3	0	0	12
6/22	15	2	8.5	1	28	12
6/22	16	2	9.3	0	0	12
6/23	17	1	10.0	0	0	13
6/23	18	1	9.8	0	0	13
6/23	19	2	9.0	0	0	13
6/23	20	2	8.8	0	0	13
6/23	21	1	9.3	0	0	13
6/23	22	1	9.3	0	0	13
6/23	23	2	9.5	0	0	13
6/23	24	2	9.8	1	24	13
6/24	25	1	8.8	0	0	13
6/24	26	1	9.0	1	27	13
6/24	27	2	5.9	1	41	13
6/24	28	2	7.5	0	0	13
6/25	29	1	11.5	1	21	13
6/25	30	1	10.8	1	22	13
6/25	31	2	10.0	1	24	13
6/25	32	2	8.5	4	113	13
6/25	33	1	9.3	1	26	13
6/25	34	1	9.8	0	0	13
6/25	35	2	7.0	58	1989	13
6/25	36	2	6.1	80	3148	13
6/26	37	1	7.8	0	0	13
6/26	38	1	7.5	0	0	13

Appendix A.1. Sockeye salmon test-fishing data, Kvichak River, 2000

Date	Set No.	Station	Mean Fishing Time(min)	Sockeye Catch	Test Fishing Index	Water Temp(C)
6/26	39	2	6.5	12	443	13
6/26	40	2	7.0	15	514	13
6/26	41	1	8.0	1	30	13
6/26	42	1	7.5	0	0	13
6/26	43	2	7.5	36	1152	13
6/26	44	2	7.0	91	3120	13
6/27	45	1	8.3	0	0	13
6/27	46	1	7.5	0	0	13
6/27	47	2	7.8	0	0	13
6/27	48	2	7.5	2	64	13
6/28	49	1	9.3	0	0	12
6/28	50	1	8.0	0	0	12
6/28	51	2	8.3	6	174	12
6/28	52	2	8.8	7	191	12
6/28	53	1	6.8	96	3388	12
6/28	54	2	6.8	97	3424	12
6/29	55	1	8.0	23	690	13
6/29	56	2	7.0	13	446	13
6/30	57	1	8.3	22	636	12
6/30	58	2	6.8	38	1341	12
6/30	59	1	5.6	89	3814	12
6/30	60	2	3.8	123	7768	12
7/01	61	2	8.5	42	1186	13
7/01	62	1	8.0	131	3930	13
7/01	63	2	4.1	126	7376	13
7/01	64	1	5.0	107	5136	13
7/02	65	2	8.8	8	218	13
7/02	66	1	7.8	3	92	13
7/02	67	1	9.8	13	318	13
7/02	68	2	8.0	45	1350	13
7/03	69	1	9.0	1	27	12
7/03	70	2	8.5	1	28	12
7/03	71	1	8.0	7	210	12
7/03	72	2	9.3	9	232	12
7/04	73	1	9.3	0	0	12
7/04	74	2	9.5	0	0	12
7/04	75	1	10.0	0	0	12
7/04	76	1	10.0	0	0	12

Appendix A.1. Sockeye salmon test-fishing data, Kvichak River, 2000

Date	Set No.	Station	Mean Fishing Time(min)	Sockeye Catch	Test Fishing Index	Water Temp(C)
7/04	77	2	10.3	2	47	12
7/04	78	2	10.5	1	23	12
7/05	79	1	9.3	0	0	13
7/05	80	1	8.5	0	0	13
7/05	81	2	9.5	0	0	13
7/05	82	2	9.3	0	0	13
7/05	83	1	9.5	0	0	13
7/05	84	1	9.5	0	0	13
7/05	85	2	10.3	4	93	13
7/05	86	2	8.8	2	55	13
7/06	87	2	8.3	0	0	14
7/06	88	2	8.3	0	0	14
7/06	89	1	8.5	0	0	14
7/06	90	1	8.3	0	0	14
7/06	91	1	10.8	0	0	14
7/06	92	1	9.5	0	0	14
7/06	93	2	10.3	0	0	14
7/06	94	2	9.8	0	0	14
7/07	95	1	7.3	51	1677	13
7/07	96	2	7.5	19	608	13
7/07	97	1	7.5	31	992	13
7/07	98	2	5.8	65	2690	13
7/08	99	1	7.5	37	1184	13
7/08	100	2	7.0	39	1337	13
7/08	101	1	7.8	12	369	13
7/08	102	2	7.5	48	1536	13
7/09	103	1	8.5	0	0	14
7/09	104	2	9.5	2	51	14
7/09	105	1	10.5	1	23	14
7/09	106	1	10.0	0	0	14
7/09	107	2	8.0	23	690	14
7/09	108	2	7.8	11	339	14
7/10	109	1	8.8	9	245	14
7/10	110	1	8.8	3	82	14
7/10	111	2	7.0	81	2777	14
7/10	112	2	7.8	102	3139	14
7/11	113	1	7.8	4	123	14
7/11	114	2	7.0	91	3120	14

Appendix A.1. Sockeye salmon test-fishing data, Kvichak River, 2000

Date	Set No.	Station	Mean Fishing Time(min)	Sockeye Catch	Test Fishing Index	Water Temp(C)
7/11	115	1	7.8	65	2000	14
7/11	116	2	4.1	112	6556	14
7/12	^a					14
7/13	117	1	5.3	92	4166	14
7/13	118	2	6.1	36	1416	14
7/13	119	1	2.6	96	8862	14
7/13	120	2	3.1	87	6736	14
7/14	121	2	6.5	40	1477	14
7/14	122	1	6.5	63	2326	14
7/14	123	1	2.4	48	4800	14
7/14	124	1	6.7	81	2991	14
7/14	125	2	2.5	71	6816	14
7/15	126	1	4.1	88	5005	14
7/15	127	2	3.8	73	4611	14
7/15	128	1	2.7	52	4622	14
7/15	129	2	2.6	82	7569	14
7/16	130	1	1.8	12	1600	14
7/16	131	2	2.1	17	1943	14
7/16	132	1	3.7	14	908	14
7/16	133	2	1.5	48	7680	14

^a No test fishing conducted due to boat motor problems. Daily index interpolated using data from July 11 and 13.

Appendix A.2. Sockeye salmon test-fishing data, Egegik River, 2000

Date	Set No.	Station	Mean Fishing Time(min)	Sockeye Catch	Test Fishing Index	Water Temp(C)
6/14	1	1	9.8	0	0	9
6/14	2	2	9.3	1	26	9
6/14	3	1	9.3	1	26	9
6/14	4	2	9.0	0	0	9
6/15	5	1	8.5	0	0	9
6/15	6	2	8.6	1	28	9
6/15	7	1	8.6	1	28	9
6/15	8	2	9.0	7	187	9
6/15	9	1	9.5	1	25	9
6/15	10	2	8.9	0	0	9
6/15	11	1	8.6	0	0	9
6/15	12	2	9.3	0	0	9
6/16	13	1	8.8	1	27	9
6/16	14	2	8.1	2	59	9
6/16	15	1	10.4	1	23	9
6/16	16	2	10.1	3	71	9
6/16	17	1	9.8	0	0	9
6/16	18	2	10.5	1	23	9
6/16	19	1	10.5	3	69	9
6/16	20	2	10.3	1	23	9
6/17	21	1	8.5	1	28	9
6/17	22	2	8.5	0	0	9
6/17	23	1	8.8	1	27	9
6/17	24	2	8.9	3	81	9
6/17	25	2	7.8	30	923	9
6/17	26	1	6.8	2	71	9
6/17	27	2	8.8	3	82	9
6/17	28	1	8.9	0	0	9
6/18	29	1	9.6	2	50	9
6/18	30	2	7.3	13	427	9
6/18	31	1	9.5	4	101	9
6/18	32	2	8.8	45	1227	9
6/18	33	1	7.0	9	309	9
6/18	34	2	9.9	13	315	9
6/18	35	1	8.4	4	114	9
6/18	36	2	7.1	4	135	9
6/19	37	1	8.3	4	116	9
6/19	38	2	7.8	41	1262	9
6/19	39	1	9.0	16	427	9
6/19	40	2	8.1	46	1363	9

Appendix A.2. Sockeye salmon test-fishing data, Egegik River, 2000

Date	Set No.	Station	Mean Fishing Time(min)	Sockeye Catch	Test Fishing Index	Water Temp(C)
6/19	41	1	7.3	21	690	9
6/19	42	2	9.1	43	1134	9
6/19	43	1	8.9	3	81	9
6/19	44	2	8.0	13	390	9
6/20	45	1	6.3	4	152	9
6/20	46	2	6.8	10	353	9
6/20	47	1	6.5	7	259	9
6/20	48	2	6.5	14	517	9
6/20	49	1	6.5	18	665	9
6/20	50	2	5.9	20	814	9
6/20	51	1	7.9	7	213	9
6/20	52	2	6.9	8	278	9
6/21	53	1	8.5	2	57	9
6/21	54	2	10.0	5	120	9
6/21	55	1	8.5	3	85	9
6/21	56	2	7.0	15	514	9
6/21	57	1	9.8	18	441	9
6/21	58	2	8.5	2	57	9
6/21	59	1	9.8	3	74	9
6/21	60	2	10.1	3	71	9
6/22	61	1	8.5	1	28	9
6/22	62	2	6.9	1	35	9
6/22	63	1	8.6	1	28	9
6/22	64	2	8.5	5	141	9
6/22	65	1	9.0	3	80	9
6/22	66	2	8.5	1	28	9
6/22	67	1	9.0	2	53	9
6/22	68	2	9.4	1	26	9
6/23	69	1	7.0	4	137	11
6/23	70	2	6.8	6	212	11
6/23	71	1	6.6	2	73	11
6/23	72	2	6.9	7	244	11
6/23	73	1	8.9	0	0	11
6/23	74	2	8.5	0	0	11
6/23	75	1	9.6	1	25	11
6/23	76	2	10.0	0	0	11
6/24	77	1	6.0	16	640	11
6/24	78	2	5.0	51	2448	11
6/24	79	1	5.8	34	1407	11
6/24	80	2	3.5	28	1920	11

Appendix A.2. Sockeye salmon test-fishing data, Egegik River, 2000

Date	Set No.	Station	Mean Fishing Time(min)	Sockeye Catch	Test Fishing Index	Water Temp(C)
6/24	81	1	2.4	66	6600	11
6/24	82	2	2.3	52	5426	11
6/24	83	1	2.5	56	5376	11
6/24	84	2	3.5	37	2537	11
6/25	85	1	3.9	54	3323	11
6/25	86	2	5.1	49	2306	11
6/25	87	1	4.5	36	1920	11
6/25	88	2	5.1	55	2588	11
6/25	89	1	8.6	6	167	11
6/25	90	2	9.0	4	107	11
6/25	91	1	9.0	13	347	11
6/25	92	2	9.1	14	369	11
6/26	93	1	9.8	6	147	11
6/26	94	2	7.6	5	158	11
6/26	95	1	11.9	9	182	11
6/26	96	2	9.1	7	185	11
6/26	97	1	8.6	0	0	11
6/26	98	2	8.8	1	27	11
6/26	99	1	8.8	2	55	11
6/26	100	2	9.4	9	230	11
6/27	101	1	8.8	5	136	13
6/27	102	2	8.8	6	164	13
6/27	103	1	8.8	2	55	13
6/27	104	2	9.1	6	158	13
6/28	105	1	8.8	4	109	13
6/28	106	2	8.8	3	82	13
6/28	107	1	9.5	2	51	13
6/28	108	2	8.9	4	108	13
6/28	109	1	8.5	0	0	13
6/28	110	2	8.6	8	223	13
6/28	111	1	8.5	0	0	13
6/28	112	2	8.9	7	189	13
6/29	113	1	8.6	3	84	13
6/29	114	2	8.6	5	140	13
6/29	115	1	9.3	4	103	13
6/29	116	2	8.8	2	55	13
6/29	117	1	8.6	2	56	13
6/29	118	2	10.0	36	864	13
6/29	119	1	8.5	2	57	13
6/29	120	2	9.3	19	490	13

Appendix A.2. Sockeye salmon test-fishing data, Egegik River, 2000

Date	Set No.	Station	Mean Fishing Time(min)	Sockeye Catch	Test Fishing Index	Water Temp(C)
6/30	121	1	8.6	0	0	11
6/30	122	2	8.8	5	136	11
6/30	123	1	9.1	2	53	11
6/30	124	2	9.3	16	413	11
6/30	125	1	9.0	2	53	11
6/30	126	2	8.3	15	434	11
6/30	127	1	8.6	3	84	11
6/30	128	2	9.4	23	587	11
7/01	129	1	8.3	0	0	11
7/01	130	2	8.4	5	143	11
7/01	131	1	8.5	0	0	11
7/01	132	2	9.4	2	51	11
7/01	133	1	9.0	1	27	11
7/01	134	2	7.9	1	30	11
7/01	135	1	8.5	2	57	11
7/01	136	2	9.6	6	150	11
7/02	137	1	6.3	1	38	11
7/02	138	2	8.5	21	593	11
7/02	139	1	7.8	6	185	11
7/02	140	2	8.0	24	720	11
7/02	141	1	8.3	2	58	11
7/02	142	2	9.1	1	26	11
7/02	143	1	10.3	1	23	11
7/02	144	2	9.3	4	103	11
7/03	145	1	9.3	0	0	11
7/03	146	2	7.5	1	32	11
7/03	147	1	8.8	0	0	11
7/03	148	2	8.0	0	0	11
7/03	149	1	10.6	0	0	11
7/03	150	2	10.8	1	22	11
7/03	151	1	9.5	0	0	11
7/03	152	2	8.4	2	57	11
7/04	153	1	8.8	2	55	10
7/04	154	2	6.8	27	953	10
7/04	155	1	8.8	14	382	10
7/04	156	2	6.3	51	1943	10
7/04	157	1	9.4	18	460	10
7/04	158	2	3.3	73	5309	10
7/04	159	1	5.5	36	1571	10
7/04	160	2	4.1	79	4624	10

Appendix A.2. Sockeye salmon test-fishing data, Egegik River, 2000

Date	Set No.	Station	Mean Fishing Time(min)	Sockeye Catch	Test Fishing Index	Water Temp(C)
7/05	161	1	7.8	4	123	10
7/05	162	2	7.3	12	395	10
7/05	163	1	7.1	1	34	10
7/05	164	2	7.1	8	270	10
7/05	165	1	8.9	4	108	10
7/05	166	2	9.1	27	712	10
7/05	167	1	10.0	6	144	10
7/05	168	2	9.1	24	633	10
7/06	169	1	7.9	0	0	10
7/06	170	2	6.8	3	106	10
7/06	171	1	7.5	0	0	10
7/06	172	2	7.8	3	92	10
7/06	173	1	10.6	0	0	10
7/06	174	2	8.8	4	109	10
7/06	175	1	7.6	0	0	10
7/06	176	2	9.1	5	132	10
7/07	177	1	6.8	0	0	11
7/07	178	2	7.0	1	34	11
7/07	179	1	6.8	0	0	11
7/07	180	2	7.5	2	64	11
7/07	181	1	7.9	0	0	11
7/07	182	2	7.9	1	30	11
7/07	183	1	9.6	1	25	11
7/07	184	2	7.9	4	122	11
7/08	185	1	9.0	0	0	11
7/08	186	2	6.8	2	71	11
7/08	187	1	8.4	0	0	11
7/08	188	2	8.8	1	27	11
7/08	189	1	9.5	0	0	11
7/08	190	2	10.4	8	185	11
7/08	191	1	10.3	1	23	11
7/08	192	2	9.8	3	74	11
7/09	193	1	7.3	0	0	11
7/09	194	2	7.4	3	97	11
7/09	195	1	10.0	0	0	11
7/09	196	2	7.8	7	215	11
7/09	197	1	8.6	0	0	11
7/09	198	2	9.1	12	317	11
7/09	199	1	8.9	6	162	11
7/09	200	2	9.0	11	293	11

Appendix A.2. Sockeye salmon test-fishing data, Egegik River, 2000

Date	Set No.	Station	Mean Fishing Time(min)	Sockeye Catch	Test Fishing Index	Water Temp(C)
7/10	201	1	10.4	9	208	12
7/10	202	2	9.1	34	897	12
7/10	203	1	7.8	11	339	12
7/10	204	2	10.1	57	1355	12
7/10	205	1	9.0	8	213	12
7/10	206	2	7.6	64	2021	12
7/10	207	1	9.3	24	619	12
7/10	208	2	8.8	86	2346	12
7/11	209	1	11.0	10	218	13
7/11	210	2	7.1	67	2265	13
7/11	211	1	11.0	33	720	13
7/11	212	2	11.5	29	605	13
7/11	213	1	8.8	7	191	13
7/11	214	2	10.9	33	727	13
7/11	215	1	10.0	23	552	13
7/11	216	2	12.8	36	675	13
7/12	217	1	8.9	4	108	13
7/12	218	2	7.8	40	1231	13
7/12	219	1	7.0	27	926	13
7/12	220	2	9.6	61	1525	13
7/13	221	1	7.5	15	480	15
7/13	222	2	8.6	19	530	15
7/13	223	1	9.1	9	237	15
7/13	224	2	10.0	33	792	15
7/13	225	1	10.1	4	95	15
7/13	226	2	10.0	73	1752	15
7/13	227	1	8.9	11	297	15
7/13	228	2	15.3	36	565	15

Appendix A 3. Sockeye salmon test-fishing data, Ugashik River, 200

Date	Set No.	Station	Mean Fishing Time(min)	Sockeye Catch	Test Fishing Index	Water Temp(C)
6/24	1	1	6.6	1	36	12
6/24	2	2	6.5	2	74	12
6/24	3	1	6.7	3	107	12
6/24	4	2	6.3	0	0	12
6/25	5	1	9.1	3	79	12
6/25	6	2	9.3	1	26	12
6/25	7	1	8.3	0	0	12
6/25	8	2	8.3	2	58	12
6/25	9	1	8.5	0	0	13
6/25	10	2	8.4	0	0	13
6/25	11	1	11.6	3	62	13
6/25	12	2	8.1	1	30	13
6/26	13	1	13.0	2	37	13
6/26	14	2	8.0	0	0	13
6/26	15	1	10.6	1	23	13
6/26	16	2	10.0	1	24	13
6/26	17	1	13.0	1	19	14
6/26	18	2	15.5	2	31	14
6/26	19	1	15.5	0	0	14
6/26	20	2	12.1	0	0	14
6/27	21	1	12.3	0	0	14
6/27	22	2	12.4	0	0	14
6/27	23	1	11.8	1	20	14
6/27	24	2	11.3	0	0	14
6/27	25	1	10.8	0	0	14
6/27	26	2	12.3	2	39	14
6/27	27	1	10.9	1	22	14
6/27	28	2	12.9	0	0	14
6/28	29	1	11.2	1	21	14
6/28	30	2	11.3	2	42	14
6/28	31	1	11.1	1	22	14
6/28	32	2	11.2	1	21	14
6/29	33	1	11.2	1	21	14
6/29	34	2	11.3	4	85	14
6/29	35	1	11.3	1	21	14
6/29	36	2	11.2	9	193	14
6/29	37	1	11.6	15	310	14
6/29	38	2	7.4	10	324	14
6/29	39	1	7.2	6	200	14

Appendix A.3. Sockeye salmon test-fishing data, Ugashik River, 200

Date	Set No.	Station	Mean Fishing Time(min)	Sockeye Catch	Test Fishing Index	Water Temp(C)
6/29	40	2	7.1	7	237	14
6/30	41	1	10.9	47	1035	14
6/30	42	2	6.3	8	305	14
6/30	43	1	6.7	24	860	13
6/30	44	2	5.9	14	569	13
6/30	45	1	3.4	10	706	13
6/30	46	2	3.3	8	582	13
7/01	47	1	4.0	38	2280	13
7/01	48	2	2.5	11	1056	13
7/01	49	1	2.5	21	2016	13
7/01	50	2	2.3	8	835	13
7/01	51	1	1.6	4	600	13
7/01	52	2	2.0	7	840	13
7/02	53	1	2.8	31	2657	12
7/02	54	2	3.0	28	2240	12
7/02	55	1	2.8	16	1371	12
7/02	56	2	3.3	12	872	12
7/03	57	1	3.9	28	1723	13
7/03	58	2	2.9	28	2317	13
7/03	59	1	2.8	9	771	13
7/03	60	2	3.1	12	929	13
7/03	61	1	2.6	16	1477	12
7/03	62	2	2.6	23	2123	12
7/03	63	1	2.6	8	738	12
7/03	64	2	2.5	10	960	12
7/04	65	1	3.6	8	533	12
7/04	66	2	4.8	3	150	12
7/04	67	1	4.9	3	147	12
7/04	68	2	7.0	3	103	12
7/04	69	1	7.7	3	94	12
7/04	70	2	7.7	2	62	12
7/04	71	1	7.5	5	160	12
7/04	72	2	7.4	5	162	12
7/05	73	1	7.3	1	33	12
7/05	74	2	7.6	1	32	12
7/05	75	1	12.0	4	80	12
7/05	76	2	11.9	1	20	12
7/05	77	1	11.9	3	61	13
7/05	78	2	5.4	1	44	13

Appendix A.3. Sockeye salmon test-fishing data, Ugashik River, 200

Date	Set No.	Station	Mean Fishing Time(min)	Sockeye Catch	Test Fishing Index	Water Temp(C)
7/05	79	1	5.3	4	181	13
7/05	80	2	5.8	2	83	13
7/06	81	1	11.5	0	0	13
7/06	82	2	11.9	0	0	13
7/06	83	1	11.1	0	0	13
7/06	84	2	12.0	1	20	13
7/06	85	1	12.3	0	0	14
7/06	86	2	12.4	2	39	14
7/06	87	1	11.9	6	121	14
7/06	88	2	11.5	3	63	14
7/07	89	1	11.2	0	0	13
7/07	90	2	11.2	0	0	13
7/07	91	1	11.4	0	0	13
7/07	92	2	11.4	0	0	13
7/07	93	1	11.3	1	21	14
7/07	94	2	11.3	2	42	14
7/07	95	1	11.6	4	83	14
7/07	96	2	13.2	1	18	14
7/08	97	1	11.6	4	83	13
7/08	98	2	12.4	2	39	13
7/08	99	1	12.6	4	77	13
7/08	100	2	11.9	1	20	13
7/08	101	1	11.0	10	218	14
7/08	102	2	11.0	5	109	14
7/08	103	1	12.6	8	152	14
7/08	104	2	11.5	3	63	14
7/09	105	1	11.5	3	63	14
7/09	106	2	11.5	4	83	14
7/09	107	1	12.0	6	120	14
7/09	108	2	11.5	2	42	14
7/09	109	1	11.7	7	144	13
7/09	110	2	11.3	3	64	13
7/09	111	1	11.3	8	170	13
7/09	112	2	12.5	8	154	13
7/10	113	1	12.5	6	115	13
7/10	114	2	12.9	5	93	13
7/10	115	1	12.7	9	170	13
7/10	116	2	12.4	12	232	13
7/10	117	1	12.7	12	227	14

Appendix A.3. Sockeye salmon test-fishing data, Ugashik River, 200

Date	Set No.	Station	Mean Fishing Time(min)	Sockeye Catch	Test Fishing Index	Water Temp(C)
7/10	118	2	12.0	3	60	14
7/10	119	1	11.8	15	305	14
7/10	120	2	11.5	4	84	14
7/11	121	1	11.3	5	106	13
7/11	122	2	12.4	2	39	13
7/11	123	1	11.9	5	101	13
7/11	124	2	11.7	8	164	13
7/11	125	1	12.1	13	258	14
7/11	126	2	8.3	13	376	14
7/11	127	1	8.9	26	701	14
7/11	128	2	6.4	2	75	14
7/12	129	1	11.5	6	125	14
7/12	130	2	10.4	18	415	14
7/12	131	1	10.5	4	91	14
7/12	132	2	10.5	11	251	14
7/13	133	1	9.8	25	612	16
7/13	134	2	6.3	7	267	16
7/13	135	1	6.6	21	764	16
7/13	136	2	6.3	2	76	16
7/13	137	1	10.4	5	115	16
7/13	138	2	10.5	13	297	16
7/13	139	1	10.5	16	366	16
7/13	140	2	6.4	6	225	16
7/14	141	1	6.4	13	488	16
7/14	142	2	6.1	6	236	16
7/14	143	1	6.6	20	727	16
7/14	144	2	6.5	8	295	16
7/14	145	1	10.4	5	115	16
7/14	146	2	10.7	23	516	16
7/14	147	1	11.5	0	0	16
7/14	148	2	12.8	25	469	16
7/15	149	1	6.9	16	557	16
7/15	150	2	6.3	20	762	16
7/15	151	1	6.1	6	236	16
7/15	152	2	6.8	20	706	16
7/15	153	1	6.9	3	104	16
7/15	154	2	6.4	15	563	16
7/15	155	1	5.5	5	218	16
7/15	156	2	4.6	7	365	16

Appendix A.3. Sockeye salmon test-fishing data, Ugashik River, 200

Date	Set No.	Station	Mean Fishing Time(min)	Sockeye Catch	Test Fishing Index	Water Temp(C)
7/16	157	1	2.4	39	3900	14
7/16	158	2	2.9	22	1821	14
7/16	159	1	3.2	32	2400	14
7/16	160	2	2.6	17	1569	14
7/16	161	1	2.4	10	1000	14
7/16	162	2	2.4	40	4000	14
7/16	163	1	2.6	7	646	14
7/16	164	2	2.3	33	3443	14
7/17	165	1	2.9	21	1738	13
7/17	166	2	2.0	24	2880	13
7/17	167	1	1.8	9	1200	13
7/17	168	2	2.0	17	2040	13
7/17	169	1	2.0	1	120	13
7/17	170	2	3.3	25	1818	13
7/17	171	1	2.9	6	497	13
7/17	172	2	1.9	20	2526	13
7/18	173	1	2.4	25	2500	13
7/18	174	2	1.8	10	1333	13
7/18	175	1	2.0	10	1200	13
7/18	176	2	1.8	8	1067	13
7/18	177	1	3.7	3	195	13
7/18	178	2	2.6	11	1015	13
7/18	179	1	4.4	2	109	13
7/18	180	2	2.5	12	1152	13
7/19	181	1	2.5	21	2016	12
7/19	182	2	2.5	17	1632	12
7/19	183	1	2.3	31	3235	12
7/19	184	2	2.5	11	1056	12
7/19	185	1	3.6	6	400	11
7/19	186	2	3.4	4	282	11
7/19	187	1	3.5	5	343	11
7/19	188	2	3.4	7	494	11
7/20	189	1	3.8	28	1768	11
7/20	190	2	2.5	8	768	11
7/20	191	1	2.4	4	400	11
7/20	192	2	2.4	12	1200	11

Appendix A.4. Sockeye salmon test-fishing data, Igushik River, 2000.

Date	Set No.	Station	Mean Fishing Time(min)	Sockeye Catch	Test Fishing Index	Water Temp(C)
6/16	1	1	10.3	3	70	10
6/16	2	2	10.8	0	0	10
6/16	3	1	8.5	0	0	10
6/16	4	2	7.5	0	0	10
6/17	a					10
6/18	5	1	15.8	0	0	10
6/18	6	2	15.8	0	0	10
6/18	7	1	14.8	2	32	10
6/18	8	2	12.0	0	0	10
6/18	9	1	15.5	38	588	10
6/18	10	2	14.8	1	16	10
6/18	11	1	12.3	23	449	10
6/18	12	2	11.8	1	20	10
6/19	13	1	8.5	0	0	10
6/19	14	2	11.3	0	0	10
6/19	15	1	15.5	1	16	10
6/19	16	2	14.3	6	101	10
6/19	17	1	7.0	36	1234	10
6/19	18	2	12.5	8	154	10
6/19	19	1	12.8	36	675	10
6/19	20	2	11.0	49	1069	10
6/20	21	1	14.5	0	0	10
6/20	22	2	14.5	0	0	10
6/20	23	1	15.5	2	31	10
6/20	24	2	10.5	3	69	10
6/20	25	1	7.5	3	96	10
6/20	26	2	11.3	10	212	10
6/20	27	1	10.0	2	48	10
6/20	28	2	15.8	15	228	10
6/21	29	1	14.5	1	17	10
6/21	30	2	11.0	0	0	10
6/21	31	1	11.5	1	21	10
6/21	32	2	11.0	2	44	10
6/21	33	1	11.0	0	0	11
6/21	34	2	8.8	3	82	11
6/21	35	1	9.8	1	25	11
6/21	36	2	11.0	2	44	11
6/22	37	1	11.3	0	0	11

Appendix A.4. Sockeye salmon test-fishing data, Igushik River, 2000.

Date	Set No.	Station	Mean Fishing Time(min)	Sockeye Catch	Test Fishing Index	Water Temp(C)
6/22	38	2	11.0	0	0	11
6/22	39	1	15.3	0	0	11
6/22	40	2	12.5	0	0	11
6/22	41	1	16.0	0	0	12
6/22	42	2	7.3	1	33	12
6/22	43	1	14.3	1	17	12
6/22	44	2	9.0	0	0	12
6/23	45	1	15.0	0	0	11
6/23	46	2	15.0	3	48	11
6/23	47	1	12.8	0	0	11
6/23	48	2	9.0	2	53	11
6/23	49	1	10.8	23	511	12
6/23	50	2	5.5	4	175	12
6/23	51	1	11.5	13	271	12
6/23	52	2	8.0	12	360	12
6/24	53	1	8.3	1	29	12
6/24	54	2	6.5	1	37	12
6/24	55	1	7.5	0	0	12
6/24	56	2	1.0	0	0	12
6/24	57	1	7.5	31	992	13
6/24	58	2	5.5	8	349	13
6/24	59	1	11.5	17	355	13
6/24	60	2	10.5	3	69	13
6/25	61	1	13.5	2	36	12
6/25	62	2	9.8	16	392	12
6/25	63	1	15.3	5	78	12
6/25	64	2	11.8	17	346	12
6/25	65	1	12.0	9	180	13
6/25	66	2	7.8	20	615	13
6/25	67	1	12.8	1	19	13
6/25	68	2	3.5	36	2469	13
6/26	69	1	12.5	4	77	13
6/26	70	2	9.0	15	400	13
6/26	71	1	13.3	8	144	13
6/26	72	2	5.8	32	1324	13
6/26	73	1	11.5	0	0	14
6/26	74	2	11.3	0	0	14
6/26	75	1	12.5	0	0	14

Appendix A.4. Sockeye salmon test-fishing data, Igushik River, 2000.

Date	Set No.	Station	Mean Fishing Time(min)	Sockeye Catch	Test Fishing Index	Water Temp(C)
6/26	76	2	10.8	6	133	14
6/27	77	1	11.5	0	0	14
6/27	78	2	8.5	8	226	14
6/27	79	1	11.5	0	0	14
6/27	80	2	6.5	13	480	14
6/27	81	1	11.5	0	0	15
6/27	82	2	11.3	0	0	15
6/27	83	1	11.3	0	0	15
6/27	84	2	10.3	0	0	15
6/28	85	1	11.5	0	0	15
6/28	86	2	10.5	0	0	15
6/28	87	1	11.5	0	0	15
6/28	88	2	15.5	1	16	15
6/29	89	1	12.5	0	0	15
6/29	90	2	11.8	0	0	15
6/29	91	1	12.5	0	0	15
6/29	92	2	14.8	0	0	15
6/29	93	1	10.5	0	0	15
6/29	94	2	10.8	0	0	15
6/29	95	1	9.5	0	0	15
6/29	96	2	14.8	0	0	15
6/30	97	1	11.5	0	0	15
6/30	98	2	9.8	3	74	15
6/30	99	1	10.8	0	0	15
6/30	100	2	6.5	0	0	15
6/30	101	1	12.8	27	506	14
6/30	102	2	8.0	12	360	14
6/30	103	1	11.8	10	203	14
6/30	104	2	8.8	28	764	14
7/01	105	1	11.5	5	104	14
7/01	106	2	7.8	9	279	14
7/01	107	1	10.8	16	356	14
7/01	108	2	5.0	19	912	14
7/01	109	1	3.5	58	3977	14
7/01	110	2	9.8	18	441	14
7/01	111	1	2.0	60	7200	14
7/01	112	2	3.5	49	3360	14
7/02	113	1	11.5	7	146	14

Appendix A.4. Sockeye salmon test-fishing data, Igushik River, 2000.

Date	Set No.	Station	Mean Fishing Time(min)	Sockeye Catch	Test Fishing Index	Water Temp(C)
7/02	114	2	9.8	1	25	14
7/02	115	1	9.5	11	278	14
7/02	116	2	13.8	17	296	14
7/02	117	1	5.5	25	1091	14
7/02	118	2	3.5	55	3771	14
7/02	119	1	2.3	58	6052	14
7/02	120	2	1.8	65	8667	14
7/03	121	1	5.5	10	436	14
7/03	122	2	8.5	5	141	14
7/03	123	1	9.5	6	152	14
7/03	124	2	6.0	11	440	14
7/03	125	1	11.0	6	131	14
7/03	126	2	10.5	17	389	14
7/03	127	1	7.5	22	704	14
7/03	128	2	3.5	59	4046	14
7/04	129	1	10.8	9	200	14
7/04	130	2	11.0	5	109	14
7/04	131	1	9.8	5	122	14
7/04	132	2	9.5	3	76	14
7/04	133	1	12.5	12	230	14
7/04	134	2	11.5	8	167	14
7/04	135	1	11.0	9	196	14
7/04	136	2	10.8	7	156	14
7/05	137	1	10.8	1	22	14
7/05	138	2	11.5	4	84	14
7/05	139	1	10.8	1	22	14
7/05	140	2	13.0	0	0	14
7/05	141	1	12.0	3	60	14
7/05	142	2	13.3	3	54	14
7/05	143	1	11.8	9	183	14
7/05	144	2	13.0	9	166	14
7/06	145	1	11.0	0	0	14
7/06	146	2	11.5	2	42	14
7/06	147	1	11.5	0	0	14
7/06	148	2	12.5	12	230	14
7/06	149	1	11.5	0	0	14
7/06	150	2	12.3	2	39	14
7/06	151	1	13.8	0	0	14

Appendix A.4. Sockeye salmon test-fishing data, Igushik River, 2000.

Date	Set No.	Station	Mean Fishing Time(min)	Sockeye Catch	Test Fishing Index	Water Temp(C)
7/06	152	2	13.8	5	87	14
7/07	153	1	11.5	0	0	14
7/07	154	2	14.0	0	0	14
7/07	155	1	15.8	0	0	14
7/07	156	2	13.0	0	0	14
7/07	157	1	13.5	0	0	14
7/07	158	2	14.0	0	0	14
7/07	159	1	14.5	0	0	14
7/07	160	2	15.5	0	0	14
7/08	161	1	13.0	0	0	14
7/08	162	2	15.0	0	0	14
7/08	163	1	15.3	1	16	14
7/08	164	2	14.8	2	32	14
7/08	165	1	12.5	0	0	14
7/08	166	2	15.5	0	0	14
7/08	167	1	14.5	0	0	14
7/08	168	2	13.5	0	0	14
7/09	169	1	13.3	1	18	14
7/09	170	2	13.3	0	0	14
7/09	171	1	11.3	1	21	14
7/09	172	2	13.5	0	0	14

^a No test fishing conducted due to boat motor problems.

Appendix B.1. Kvichak River sockeye salmon historic test-fishing data summary, 1979 - 2000.

Year	Travel Time (d)	Cumulative Index	Last Date Fished	EPI ¹	Cumulative Tower Count	Date ²	Data Reference
1979 ³	2	21,901	6/29	243	5,330,532	7/1	Meacham (1980)
1980	2	106,315	7/9	174	18,508,524	7/11	Bue & Meacham (1981)
1981	2	20,813	7/1	83	1,723,506	7/13	Bue (1982)
1982	2	17,718	7/21	63	1,119,996	7/23	Bue (1984)
1983	2	13,234	7/12	216	2,853,198	7/14	Yuen (1985)
1984	3	45,584	7/12	222	10,111,152	7/15	Yuen et al. (1985)
1985 ⁴	5	41,649	7/16	171	7,120,506	7/23	Bue et al. (1988)
1986	1	25,923	7/15	43	1,102,242	7/16	Yuen et al. (1988)
1987	2	55,881	7/14	106	5,945,994	7/16	Fried & Bue (1988a)
1988	1	38,743	7/17	104	4,045,500	7/18	Fried & Bue (1988b)
1989	2	58,044	7/16	141	8,163,918	7/18	Stratton et al (1990)
1990	3	44,794	7/15	149	6,673,872	7/18	Stratton (1990)
1991	2	56,669	7/17	71	4,114,932	7/19	Stratton & Woolington (1992)
1992	4	46,755	7/16	100	4,686,828	7/20	Stratton & Crawford (1994)
1993	1	47,449	7/20	84	4,007,712	7/21	Stratton & Crawford (1996)
1994	2	55,073	7/15	142	7,631,076	7/17	Gray et al (1999)
1995	2	62,556	7/18	154	9,702,972	7/20	Gray et al (1999)
1996	2	18,089	7/17	77	1,396,710	7/19	Gray et al (1999)
1997	2	25,228	7/16	58	1,434,504	7/18	Gray et al (1999)
1998	2	25,041	7/16	91	2,290,584	7/18	Gray et al (1999)
1999	4	73,725	7/16	85	6,266,625	7/20	Gray (2000)
2000	2	40,186	7/16	51	1,791,282	7/18	Current Report

¹ EPI value from travel time analysis on the final day of test fishing.

² Cumulative spawning escapement date is last date fished at test fishing site plus travel time to tower site.

³ Sites used from 1979 - 1984 were located on west bank above Nakeen (site 1), and on east bank about 2 km above Sea Gull Flat Island.

⁴ Data from 1985 to present may not be comparable with those from 1979 - 1984. Test fishing sites were relocated in 1985 about 20 km upriver from old sites, and changes were made in mesh size (from 13.65 cm to 12.7 cm) and in web material (from multifilament nylon to multistrand monofilament).

Appendix B.2. Egegik River sockeye salmon historic test-fishing data summary, 1979 - 2000.

Year	Travel Time (d)	Cumulative Index	Last Date Fished	EPI ¹	Cumulative Tower Count	Date ²	Data Reference
1979 ³	1	23,980	7/10	38	905,034	7/11	Meacham (1980)
1980	4	13,312	7/16	80	1,060,860	7/20	Bue & Meacham (1981)
1981	3	18,921	7/13	37	691,764	7/16	Bue (1982)
1982	3	30,361	7/12	34	1,029,684	7/15	Bue (1984)
1983	1	16,276	7/10	44	718,368	7/11	Yuen (1985)
1984	3	26,947	7/12	43	1,151,028	7/15	Yuen et al. (1985)
1985 ⁴	4	19,974	7/9	53	1,052,250	7/13	Bue et al. (1988)
1986	1	16,370	7/14	60	981,841	7/15	Yuen et al. (1988)
1987	2	21,810	7/14	53	1,162,464	7/16	Fried & Bue (1988a)
1988	1	21,024	7/16	76	1,591,752	7/17	Fried & Bue (1988b)
1989	3	30,343	7/12	52	1,590,234	7/15	Stratton et al (1990)
1990	3	17,578	7/16	123	2,155,062	7/19	Stratton (1990)
1991	4	31,066	7/12	88	2,722,476	7/16	Stratton & Woolington (1992)
1992	3	24,498	7/11	73	1,795,542	7/14	Stratton & Crawford (1994)
1993	1	17,189	7/10	78	1,346,160	7/11	Stratton & Crawford (1996)
1994	2	12,777	7/12	137	1,708,998	7/14	Gray et al (1999)
1995	2	11,769	7/12	100	1,139,724	7/14	Gray et al (1999)
1996	2	15,043	7/12	72	1,039,428	7/14	Gray et al (1999)
1997	2	20,136	7/12	52	1,051,500	7/14	Gray et al (1999)
1998	3	16,476	7/13	65	1,032,480	7/16	Gray et al (1999)
1999	5	20,568	7/13	82	1,686,576	7/18	Gray (2000)
2000	2	13,517	7/13	80	1,024,800	7/15	Current Report

¹ EPI value from travel time analysis on the final day of test fishing.

² Cumulative spawning escapement date is last date fished at test fishing site plus travel time to tower site.

³ Sites used from 1979 - 2000 were located about 3 km upriver from tip of Egg Island on the south (site 1), and on the north bank (site 2).

⁴ Data from 1985 to present may not be comparable with those from 1979 - 1984 because changes were made in gillnet mesh size (from 13.65cm to 13.02 cm) and in web material (from multifilament nylon to multistrand monofilament).

Appendix B.3. Ugashik River sockeye salmon historic test-fishing data summary, 1979 - 2000.

Year	Travel Time (d)	Cumulative Index	Last Date Fished	EPI ¹	Cumulative Tower Count	Date ²	Data Reference
1979 ³	9	42,880	7/13	39	1,662,348	7/22	Meacham (1980)
1980	3	85,711	7/17	30	2,550,174	7/20	Bue & Meacham (1981)
1981 ⁴	3	73,861	7/16	18	1,304,022	7/19	Bue (1982)
1982 ⁵	4	48,057	7/15	23	1,120,680	7/19	Bue (1984)
1983	1	15,485	7/16	54	831,744	7/17	Yuen (1985)
1984	8	20,138	7/17	61	1,223,286	7/25	Yuen et al. (1985)
1985 ⁶	7	30,903	7/16	32	997,026	7/26	Bue et al. (1988)
1986	9	36,786	7/15	27	1,001,492	7/24	Yuen et al. (1988)
1987 ⁷	6	14,393	7/17	41	587,964	7/23	Fried & Bue (1988a)
1988	2	16,106	7/24	39	625,752	7/26	Fried & Bue (1988b)
1989	5	36,562	7/21	46	1,669,350	7/26	Stratton et al (1990)
1990	3	20,113	7/20	34	692,310	7/23	Stratton (1990)
1991	4	27,359	7/15	82	2,255,216	7/19	Stratton & Woolington (1992)
1992	2	21,601	7/18	92	1,997,058	7/20	Stratton & Crawford (1994)
1993	2	14,793	7/13	87	1,292,046	7/15	Stratton & Crawford (1996)
1994	1	8,180	7/17	94	766,638	7/18	Gray et al (1999)
1995	3	9,609	7/17	66	1,136,262	7/20	Gray et al (1999)
1996	2	18,617	7/18	36	610,926	7/20	Gray et al (1999)
1997	3	21,969	7/18	22	481,356	7/21	Gray et al (1999)
1998	2	8,243	7/18	71	589,920	7/20	Gray et al (1999)
1999	5	17,549	7/18	84	1,474,116	7/23	Gray (2000)
2000	2	14,901	7/20	42	557,268	7/22	Current Report

¹ EPI value from travel time analysis on the final day of test fishing.

² Cumulative spawning escapement date is last date fished at test fishing site plus travel time to tower site.

³ Three sites used from 1979 - 1980 located about 1 km downriver from Ugashik Village on east bank (site 1), and on the west bank about 4 km and 5 km upriver from Ugashik Village (sites 2 & 3, respectively).

⁴ Two sites used beginning 1981 located on east bank about 7 km upriver from Ugashik Village (site 1) and on west bank about 8 km upriver from Ugashik Village (site 2).

⁵ Site 1 moved to east bank about 5 km upriver from Ugashik Village and Site 2 moved to west bank about 5 km upriver from Ugashik Village.

⁶ Data from 1985 to present may not be comparable with those from 1979 - 1984 because changes were made in gillnet mesh size (from 13.65cm to 13.02 cm) and in web material (from multifilament nylon to multistrand monofilament).

⁷ Site 1 moved to east bank about 8 km upriver from Ugashik Village and Site 2 moved to west bank about 8 km upriver from Ugashik Village.

Appendix B.4. Igushik River sockeye salmon historic test-fishing data summary, 1979 - 2000.

Year	Travel Time (d) ¹	Cumulative Index	Last Date Fished	EPI ²	Cumulative Tower Count	Date ³	Data Reference ⁴
1979 ⁵	2	45,013	7/13	17	787,542	7/15	Meacham (1980)
1980	4	38,673	7/15	50	1,945,758	7/19	Bue & Meacham (1981)
1981	4	37,975	7/14	14	532,896	7/18	Bue (1982)
1982	5	12,638	7/12	33	411,420	7/17	Bue (1984)
1983	4	15,322	7/13	11	161,754	7/17	Yuen (1985)
1984	3	25,743	7/14	6	162,054	7/17	Yuen et al. (1985)
1985 ⁶	5	15,347	7/11	13	199,386	7/16	Bue et al. (1988)
1986	4	18,288	7/14	14	262,104	7/18	Yuen et al. (1988)
1987	5	6,609	7/14	21	138,186	7/19	Fried & Bue (1988a)
1988 ⁷	2	6,186	7/13	26	160,446	7/15	Fried & Bue (1988b)
1989	1	11,802	7/8	25	296,658	7/9	Stratton et al (1990)
1990 ⁸							
1991	3	7,431	7/15	97	721,314	7/18	Stratton & Woolington (1992)
1992	4	5,175	7/13	56	289,644	7/17	Stratton & Crawford (1994)
1993	6	511	7/11	760	388,512	7/17	Stratton & Crawford (1996)
1994	2	2,343	7/13	108	253,044	7/15	Gray et al (1999)
1995	2	3,609	7/8	105	378,945	7/10	Gray et al (1999)
1996	3	5,295	7/12	62	328,290	7/15	Gray et al (1999)
1997	3	10,543	7/14	12	126,516	7/17	Gray et al (1999)
1998	2	9,080	7/12	19	172,520	7/14	Gray et al (1999)
1999	2	16,994	7/8	19	322,886	7/10	Gray (2000)
2000	3	8,079	7/9	45	387,138	7/12	Current Report

¹ Estimates for 1979-83 based on correlation coefficients; estimates for 1984-00 based on travel time analysis.

² EPI value from travel time analysis on the final day of test fishing.

³ Cumulative spawning escapement date is last date fished at test fishing site plus travel time to tower site.

⁴ Weighted season mean length, weight, travel time, and EPI values for 1979-86 were recalculated for 1987 report (Fried and Bue 1988a), and may differ from those in original report.

⁵ One site, located on south bank about 30 km upriver from district boundary, was used from 1977-84.

⁶ Site 1 moved to south bank about 28 km upriver from district boundary and site 2 added on north bank about 27 km upriver from district boundary.

⁷ Data from 1988 to present may not be comparable with those from 1979-87 because of changes in fishing method (drifting gill net rather than anchoring one end on shore).

⁸ Igushik test fish project not operated in 1990 due to budget cuts.

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